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EXAMINER	
KRASNIC, BERNARD	

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/790,234	YEUNG ET AL.	
	Examiner	Art Unit	
	BERNARD KRASNIC	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/24/2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57,69-77 and 79-81* is/are pending in the application.

4a) Of the above claim(s) *15-23,25-27,42-50,52-54,69-77 and 79-81* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,24,28-41,51 and 55-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The amendment filed 10/24/2008 have been entered and made of record.

2. The Applicant has canceled claim(s) 82-91.

3. The application has pending claim(s) 1-14, 24, 28-41, 51, and 55-57 [claims 15-23, 25-27, 42-50, 52-54, 69-77, and 79-81 remain withdrawn].

4. In response to the amendments filed on 10/24/2008:

The “Objections to the drawings, abstract, specification, and claims” have been entered and therefore the Examiner withdraws the objections to the drawings, abstract, specification, and claims.

The “Claim rejections under 35 U.S.C. 101” have been entered and therefore the Examiner withdraws the rejections under 35 U.S.C. 101.

The “Claim rejections under 35 U.S.C. 112, first paragraph” have been entered and therefore the Examiner withdraws the rejections under 35 U.S.C. 112, first paragraph.

The “Claim rejections under 35 U.S.C. 112, second paragraph” have been entered, but the Applicant has not amended a few of the addressed 35 U.S.C. 112, second paragraph issues and therefore the Examiner has once again addressed these issues.

5. The Applicant's arguments with respect to claims 1-14, 24, 28-41, 51, and 55-57 have been considered but are moot in view of the new ground(s) of rejection because the Applicant has amended independent claim(s) 1, 28, and 55.

6. Applicant's arguments filed 10/24/2008 have been fully considered but they are not persuasive.

The Applicant alleges, “The Office recognized that Taubman …” in page 27, and states respectively that the prior art references Taubman and Keesman don’t teach neither alone nor in combination encoding each of the collections of coefficients in turn. The Examiner disagrees because Keesman discloses that the Lagrange multiplier λ can be <u>estimated</u> using the slope of a RD curve at or near a target bit rate <u>for a set of source data coefficients [specific code-block]</u> (see Keesman, col. 2 at lines 19-33) *allowing the encoder to encode code-block by code-block [“in turn”]* using the Lagrange multiplier λ derived from the estimated RD curve. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Taubman's method using Keesman's teachings by including a good approximation λ by using the RD curve from the distribution of coefficient amplitudes for the specific code-block (coefficients of the specific spatial frequency) in order to reduce Taubman's complex computation of the optimal λ (see Keesman, col. 2, lines 19-33). Therefore claims 1-14, 24, 28-41, 51, and 55-57 are still not in condition for allowance because they are still not patentably distinguishable over the prior art references.

The Applicant alleges, “Furthermore, the Office cited Taubman, Section II …” in pages 27-28 through “Keesman also fails to cure the above-noted deficiency of Taubman …” in page 28, and states respectively that the prior art references Taubman and Keesman don’t teach neither alone nor in combination an adaptive threshold but rather a constant threshold λ value which is used for the entire coding process. The Examiner disagrees because Keesman does disclose an adaptive threshold (see Keesman, col. 6 at line 66 through col. 7 at line 36). Keesman discloses adaptively varying the quantization step size from block to block based on the activity of the block and that this adaptive quantization is incorporated in the calculation of the threshold λ which clearly shows that the threshold λ is adaptive. Therefore claims 1-14, 24, 28-41, 51, and 55-57 are still not in condition for allowance because they are still not patentably distinguishable over the prior art references.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 7, 28-41, and 51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

<u>Re Claims 7 and 34</u> respectively: The claim limitation “the adaptive threshold value is a predetermined constant” is indefinite and unclear because the term adaptive generally refers to something changeable, and the claim is stating that the threshold is constant

while counter intuitively also adaptive [changeable]. The Examiner suggests deleting claims 7 and 34 or seeing claims 8-9 and 35-36 for guidance on defining the adaptive threshold.

Re Claim 28 at line 20: The claim is indefinite because it is unclear and uncertain if the claim is a "computer readable medium" claim or an "article of manufacture" claim.

Claims 29-41 and 51 are dependent upon claim 28.

Re Claim 51 at line 3 respectively: The claim limitation "the global coding order" lacks clear antecedent basis. It is suggested to be -- the first coding order -- and it has been treated as such.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-14, 24, 28-41, 51, and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taubman ("High Performance Scalable Image Compression

with EBCOT" - 2000, as applied in previous Office Action) in view of Keesman et al (US 5,691,770, as applied in previous Office Action).

Re Claim 1: Taubman a method of allocating or controlling an amount of bits for encoding of source data (see Taubman, abstract, Embedded Block Coding with Optimized Truncation of the embedded bit-streams using rate-distortion [pgs 1160-111, Section II. Rate Distortion Optimization]), including: (i) defining a target bit rate for the encoding of the source data (see Taubman, abstract, Section A. Efficient One Pass Rate Control, Rmax, Section II. Rate Distortion Optmization); (ii) defining collections of coefficients of the source data (see Taubman, Section II. Rate Distortion Optmization, the collection of coefficients are code blocks of the subbands); (iii) defining a global coding order of the collections of coefficients (see Fig. 1, the image is decompossed into subbands, LL then LH then HL then HH is the order because the low resolution is where the most significant information is held); (iv) defining a plurality of coding units and corresponding allowable truncation points for each of said collections of coefficients (see Taubman, Section D. Fractional Bit Planes and Scanning Order, the coding units or coding passes with the identification of the truncation points); (v) defining a local coding order of said coding units for each of said collections of coefficients (see Taubman, Section D. Fractional Bit Planes and Scanning Order, the four coding passes P1, P2, P3, P4 are in that order); (vi) defining a rate value and a distortion value for each of said coding units of each of said collections of coefficients (see Taubman, Section D. Fractional Bit Planes and Scanning Order, Fig. 6a, the rate and distortion associated with the end of each coding pass); (vii) defining a threshold value for each of

said coding units of each of said collections of coefficients (see Taubman, Section II. Rate Distortion Optimization, rate and distortion are compared to threshold λ); and (viii) encoding each of the collections of coefficients according to the global coding order, wherein if a predetermined termination criterion is not met for a particular coding unit of the plurality of coding units of one of the collections of coefficients, the particular coding unit will be included in an output code-stream, and if the termination criterion is met, an encoding of the one of the collection of coefficients is terminated (see Taubman, Section – Introduction, last paragraph, Section II. Rate Distortion Optimization, using the RD slope information of the truncation points with the threshold decides which encoded information will and won't be outputted).

However, Taubman doesn't explicitly disclose the threshold to be adaptive and the encoding in turn since he requires the RD slope curve be pre-computed.

Keesman discloses that the optimal λ isn't required but only a good approximation by using the RD curve at or near a target bit rate for a set of source data coefficients [derived from the distribution of coefficient amplitudes for the specific code-block (coefficients of the specific spatial frequency)] (see Keesman, col. 2 at lines 19-33) *allowing the encoder to encode code-block by code-block ["in turn"]* using the Lagrange multiplier λ derived from the estimated RD curve. Keesman also discloses adaptively varying the quantization step size from block to block based on the activity of the block and that this adaptive quantization is incorporated in the calculation of the threshold λ which clearly shows that the threshold λ is adaptive (see Keesman, col. 6 at line 66 through col. 7 at line 36).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Taubman's method using Keesman's teachings by including a good adaptive approximation λ by using the RD curve from the distribution of coefficient amplitudes for the specific code-block (coefficients of the specific spatial frequency) in order to reduce Taubman's complex computation of the optimal λ (see Keesman, col. 2, lines 19-33).

Re Claim 2: Taubman further discloses said collections of coefficients of the data are code-blocks (see Taubman, Section II. Rate Distortion Optimization).

Re Claim 3: Taubman further discloses the rate value is an amount of bits needed to encode the particular coding unit, or a first neighboring coding unit according to the local coding order, of the one of the collections of coefficients and the distortion value is a distortion reduction due to an including of the coding unit in the output code-stream, or the including of a second neighboring coding unit according to the local coding order of the collection of coefficients (see Taubman, Section II. Rate Distortion Optimization, Section D. Fractional Bit Planes and Scanning Order, rate and distortion value corresponding to the end or each coding pass).

Re Claim 4: Taubman further discloses a rate-distortion value is computed from the rate value and the distortion value, and the said termination criterion is that the rate-distortion value is below the adaptive threshold value [Taubman’s threshold as modified

by Keesman's adaptive threshold as discussed above in claim 1] (see Taubman, Section – Introduction, last paragraph, Section II. Rate Distortion Optimization, Section D. Fractional Bit Planes and Scanning Order, using the RD slope information of the truncation points with the threshold decides which encoded information will and won't be outputted).

Re Claim 5: Taubman further discloses the rate-distortion value is a fractional number with a denominator being the rate value and a numerator being the distortion value for each said coding unit of each said collection of coefficients (see Taubman, Section – Introduction, last paragraph, Section II. Rate Distortion Optimization, Section D. Fractional Bit Planes and Scanning Order).

Re Claim 6: Taubman further discloses the rate-distortion value is a fractional number with a denominator being the rate value and a numerator being the distortion value for each said coding unit (see Taubman, Figs. 6a-6b, Section – Introduction, last paragraph, Section II. Rate Distortion Optimization, Section D. Fractional Bit Planes and Scanning Order).

Re Claim 7 [as best understood by the Examiner]: Taubman further discloses the adaptive threshold value [Taubman's threshold as modified by Keesman's adaptive threshold as discussed above in claim 1] is a predetermined constant common to either all the collections of coefficients, all the coding units of the one of the collections of

coefficients, or fewer than all of the coding units of the one of the collections of coefficients (see Taubman, Figs. 6a-6b, Section II. Rate Distortion Optimization, paragraph “The determination of the optimal truncation point …”, Section D. Fractional Bit Planes and Scanning Order).

Re Claim 8: Taubman further discloses the adaptive threshold value [Taubman’s threshold as modified by Keesman’s adaptive threshold as discussed above in claim 1] is a fractional number with a denominator being a difference between the target bit rate and a total amount of bits used to encode all previously encoded collections of coefficients according to the global coding order and all previously-encoded coding units of the one of the collection of coefficients according to the local coding order, and a numerator being an amount of distortion if the encoding terminates at that coding unit or a neighboring coding unit according to the local coding order (see Taubman, Figs. 6a-6b, Section II. Rate Distortion Optimization, paragraph “The determination of the optimal truncation point …”, Section D. Fractional Bit Planes and Scanning Order).

Re Claim 9: Taubman further discloses the adaptive threshold value [Taubman’s threshold as modified by Keesman’s adaptive threshold as discussed above in claim 1] is a product of (a) a fractional number with a denominator being a difference between the target bit rate and a total amount of bits used to encode all past collections of coefficients according to the global coding order and all earlier coding units of the one of the collection of coefficients according to the local coding order, and a numerator being

an amount of distortion if the encoding terminates at that coding unit, or a neighboring unit according to the local coding order (see Taubman, Figs. 6a-6b, Section II. Rate Distortion Optimization, paragraph “The determination of the optimal truncation point …”, Section D. Fractional Bit Planes and Scanning Order).

Although Taubman, as modified by Keesman, doesn’t explicitly disclose that the threshold value is a product with an additional weighting factor, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have such a feature in order to better choose an appropriate threshold value instead of possibly having an unbounded one.

Re Claim 10: Taubman further discloses the collections of coefficients are code-blocks of coefficients of the source data in a data transform domain (see Taubman, Fig. 1, Section II. Rate Distortion Optimization).

Re Claim 11: Taubman further discloses the collections of coefficients are code-blocks of coefficients in a data transform domain, and each coding unit is any intermediate coding pass (see Taubman, Fig. 1, Section II. Rate Distortion Optimization, Section D. Fractional Bit Planes and Scanning Order).

Re Claim 12: Taubman further discloses the data transform domain is a discrete wavelet domain in accordance with JPEG2000 and the any intermediate coding pass is a significance pass, a refinement pass, or a cleanup pass in accordance with

JPEG2000 (see Taubman, Fig. 1, Section I. Introduction, Section II. Rate Distortion Optimization, Section D. Fractional Bit Planes and Scanning Order, P1-P4).

Re Claim 13: Taubman further discloses the collections of coefficients are code-blocks of coefficients in a data transform domain, and the global coding order is predefined (see Taubman, Fig. 1, Section II. Rate Distortion Optimization).

Re Claim 14: Taubman further discloses the collections of coefficients are code-blocks of coefficients of the source data in a data transform domain (see Taubman, Fig. 1, Section II. Rate Distortion Optimization).

Although Taubman as modified by Keesman doesn't explicitly suggest the collections of coefficients are of data formed by a difference of the source data and another source data, it would have been obvious to one of ordinary skill in the art because it is very common in video coding to code difference frames [motion frames] in order to reduce the video encoding computation load.

Re Claim 24: Taubman further discloses the code-blocks are examined according to the global coding order (see Taubman, Fig. 1, Section II. Rate Distortion Optimization).

As to claims 28-41 and 51 [as best understood by the Examiner], the claims are the corresponding article of manufacture claims to claims 1-14 and 24 respectively. The discussions are addressed with regard to claims 1-14 and 24 respectively.

As to claims 55-57 [as best understood by the Examiner], the claims are the corresponding apparatus [means plus function] claims to claims 1-3 respectively. The discussions are addressed with regard to claims 1-3.

The limitations “means for defining” in lines 4, 5, 6, 7, 9, 11, and 13 invoke 35 U.S.C. 112, 6th paragraph.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 8:00am-4:00pm and every other Friday 8:00am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jingge Wu/
Supervisory Patent Examiner, Art Unit 2624
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January 6, 2009